

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

TRANSLATION
PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing (day/month/year) **See form PCT/ISA/210**

Applicant's or agent's file reference

UN643-11303JP CM

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/FR2005/000284

International filing date (day/month/year)

09.02.2005

Priority date (day/month/year)

10.02.2004

International Patent Classification (IPC) or both national classification and IPC

A01N43/12, A01N43/38, A01N63/04, A01G1/04

Applicant

UNIVERSITE PAUL SABATIER TOULOUSE III

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(h) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/EP

Authorized officer

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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/FR2005/000284

Box No. I

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language
_____, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/FR2005/000284

Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	1-22	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-22	NO
Industrial applicability (IA)	Claims	1-22	YES
	Claims		NO
2. Citations and explanations:			
<p>1 Reference is made to the following documents cited in the search report and in the application:</p> <p>D1: BECARD G. AND PICHE Y.: APPLIED AND ENVIRONMENTAL MICROBIOLOGY, vol. 55, no. 9, (1989-09), pages 2320-2325, XP009036591</p> <p>D2: ELIAS K.S. AND SAFIR, G.R.: APPLIED AND ENVIRONMENTAL MICROBIOLOGY, vol. 53, no. 8 (1987-08), pages 1928-1933, XP009036589</p> <p>D3: YOKOTA TAKAO ET AL: PHYTOCHEMISTRY, vol. 49, no. 7, (1998-12), pages 1967-1973, XP002296379 ISSN: 0031-9422</p> <p>D4: NEFKENS GERARD H L ET AL: JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY, vol. 45, no. 6, 1997, pages 2273-2277, XP002296378</p> <p>2 The present application relates to:</p> <p>(1) a method for treating arbuscular mycorrhizal fungi (AMF) in which at least one agent selected among GR24, GR7, Nijmegen-1, demethylsorgolactone, strigol, alectrol, sorgolactone and orobanchol (claim 1) are put in contact with the AMF,</p> <p>(2) a method for producing AMF inoculum, in which a co-culture of AMF is produced in the presence of live plant matter (host plant) corresponding at least partly to a</p>			

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/FR2005/000284

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
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constituent part of the root of a plant capable of forming a symbiosis with the AMF, characterised in that at least one agent selected among GR24, GR7, Nijmegen-1, demethylsorgolactone, strigol, alectrol, sorgolactone and orobanchol (claim 9) are also put in contact with the said co-culture,

(3) a method of cultivating a host plant capable of forming a symbiosis with the AMF, in which at least one agent for stimulating the development and/or growth of the AMF selected among GR24, GR7, Nijmegen-1, demethylsorgolactone, strigol, alectrol, sorgolactone and orobanchol is added to the cultivation soil, characterised in that the said addition of stimulating agent is done at the time of sowing the seeds of the host plant to be cultivated and/or after sowing.

(4) a composition comprising in combination a quantity of the agent for stimulating development and/or growth of the MA fungi selected among GR24, GR7, Nijmegen-1, demethylsorgolactone, strigol, alectrol, sorgolactone and orobanchol and a quantity of seeds of a host plant capable of forming a symbiosis with the AMF (claim 17) or a quantity of AMF inoculum (claim 21).

None of the documents cited in the search report anticipate claims 1 to 22 (PCT Article 33(2)). However, the application does not appear to satisfy the criteria of PCT Article 33(3) for the following reasons.

3 Documents D1 and D2 are considered to be the closest prior art to the subject matter of the independent claims 1, 9, 11, 17 and 21. D1 and D2 disclose (D1: p2324; D2:p.1931-1932) that the supplementation of the co-

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/FR2005/000284

Box No. V

Reasoned statement under Rule 43bis 1(a)(i) with regard to novelty, inventive step or industrial applicability;
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culture milieu with root exudates stimulates the development of the AMF. The exudates in D2 are obtained from *Trifolium repens*.

The problem to be solved is to propose new factors for stimulating the development and/or growth of the AMF. The solution proposed in the present application is to use a compound selected among GR24, GR7, Nijmegen-1, demtehylsorgolactone, strigol, alectrol, sorgolactone and orobanchol as a stimulator for the development and/or growth of the said MA.

It is known from D3 (p1967-1968) that the strigolactones alectrol and orobanchol are the two main natural compounds present in the root exudates of *Trifolium pratense*.

As the exudates disclosed by D2 are also obtained from *Trifolium sp.*, it is expected that alectrol and orobanchol are also the main strigolactones in the extracts described in D2.

Furthermore, it is known from D4 (p.2273, left column) that the strigolactones GR24, GR7, Nijmegen-1, demtehylsorgolactone, strigol, alectrol and sorgolactone (Fig. 4) are present in the extracts of different plant species, which are also host plants for the AMF (for example *Zea mays*).

Therefore, it could be expected that the strigolactones according to the application play a principle role in the stimulation of development and/or growth of the AMF described in D1 or D2.

Consequently, at present the solution proposed in the independent claims 1, 9, 11, 17 and 21 does not appear to

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PCT/FR2005/000284

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be inventive (PCT Article 33(3)).

4 The claims do not appear to contain characteristics that, combined with the characteristics of any claim to which they refer, satisfy the requirements of the PCT with regard to novelty and inventive step (PCT Article 33 2) and 3)).